

a grid voltage supply connected to the grid bias connection, the grid voltage supply adapted to produce separately an electron beam focus voltage and ion collection voltage at said grid, said ion collection voltage being less than said electron beam focus voltage.

7. (Amended) The X-ray tube subsystem of claim 6 wherein a Faraday cage is connected to the filament voltage supply.

8. (Amended) The X-ray tube subsystem of claim 6 further comprising an anode voltage supply connected to the anode bias connection and a ground reference, and a cathode voltage supply connected to an earth ground and the filament bias connection.

9. (Amended) A method for operating an X-ray system to reduce high voltage breakdown events, the method comprising:

providing an X-ray tube that includes a grid connected to a grid bias connection and a cathode connected to a filament bias connection; and

during X-ray tube operation, creating an ion collection voltage between the grid bias connection and the filament bias connection that is less than an electron beam focus voltage, to sweep free ions out of the X-ray tube.

14. (Amended) An X-ray examination system comprising:

an X-ray tube including a grid connected to a grid bias connection and a cathode connected to a filament bias connection;

a grid voltage supply connected to the grid bias connection, the grid voltage supply adapted to produce separately an electron beam focus voltage and an ion collection voltage at said grid, said ion collection voltage being less than said electron beam focus voltage to sweep free ions out of the X-ray tube;

an X-ray detector positioned to receive the electron beam; and
readout electronics connected to the X-ray detector.

20. (Amended) The X-ray examination system of claim 14, wherein the X-ray tube operates under a tube voltage in the range of 100-150kV, the electron beam focus voltage is greater than 100 volts, and the ion collection voltage is in the range of 10 to 30 volts.

Please add the following new claims:

--(New Claim) 21. The X-ray tube subsystem of claim 1, wherein said X-ray tube forms positive ions about said cathode and said grid voltage supply produces a negative voltage at said grid to cause said positive ions to collect at said grid.--

--(New Claim) 22. The method of claim 9 wherein said X-ray tube produces positive ions about said cathode and said ion collection voltage is a negative voltage created at said grid causing said positive ions to collect at said grid.--

--(New Claim) 23. The X-ray examination system of claim 14 wherein said X-ray tube forms positive ions about said cathode and said grid voltage supply produces a negative voltage at said grid to cause said positive ions to collect at said grid.--